



**CONFIDENTIAL**

**Report: Chilt/IF10070 AR1 Revision A**

**An ad-hoc fire resistance test performed  
on 4No air transfer grille blocks**

**Test conducted to the temperature and  
pressure conditions outlined in BS 476:  
Part 20: 1987 and the principles of BS  
476: Part 22: 1987**

**Test date: 10<sup>th</sup> September 2010**

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The details of the sponsor of test report Chilt/IF10070 are held on file by Chiltern International Fire Ltd. This report is additional to that issued as Chilt/IF10070 on 12 November 2010 and the original report shall remain valid and is not replaced by the additional report.



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[www.chilternfire.co.uk](http://www.chilternfire.co.uk)

[www.chilterndynamics.co.uk](http://www.chilterndynamics.co.uk)

[www.qmark.info](http://www.qmark.info)

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## 1 Introduction

Four air transfer grille blocks were installed into an aerated autoclaved concrete wall and tested to evaluate their fire resistance.

## 2 Specimen verification

The specimens were delivered to Chiltern International Fire Ltd (CIFL) during September 2010. CIFL fabricated the supporting construction, and installed the specimens into the supporting construction to the clients specifications.

## 3 Description of supporting constructions

The supporting construction comprised a lightweight aerated autoclaved concrete wall, 215mm thick x 1080mm wide x 1080mm high.

The supporting construction included 4No apertures 300mm wide x 300mm high x 215mm deep to accept the air transfer grille blocks.

## 4 Description of specimen

Details of the specimens are shown in the Appendix. All measurements are in mm and the descriptions are written viewing the specimens from the unexposed face unless stated otherwise.

### 4.1 Air transfer grille blocks

Each air transfer grille block was installed into its corresponding aperture within the supporting construction.

Each air transfer grille block measured 298mm high x 298mm wide x 40mm thick and were fitted 50mm from the unexposed face of the wall. Each grille block was located within the aperture by means of 4No. 50mm long wood screws, two on each face and then sealed to the wall with intumescent mastic. A 340mm high x 340mm wide steel grille cover was fixed to the wall with 50mm long wood screws, over the cut outs on both faces.

Each air transfer grille block comprised a profiled galvanised steel framework and slats, supporting flexible intumescent strips, 3mm thick x 38mm wide (details held in confidence on file by Chiltern International Fire Ltd.). The intumescent sheet strips and supporting slats were fitted at various distances apart:-

<b>Air transfer grille block A</b>	Slats and intumescent sheet fitted 35mm apart
<b>Air transfer grille block B</b>	Slats and intumescent sheet fitted 37mm apart
<b>Air transfer grille block C</b>	Slats and intumescent sheet fitted 25mm apart
<b>Air transfer grille block D</b>	Slats and intumescent sheet fitted 30mm apart

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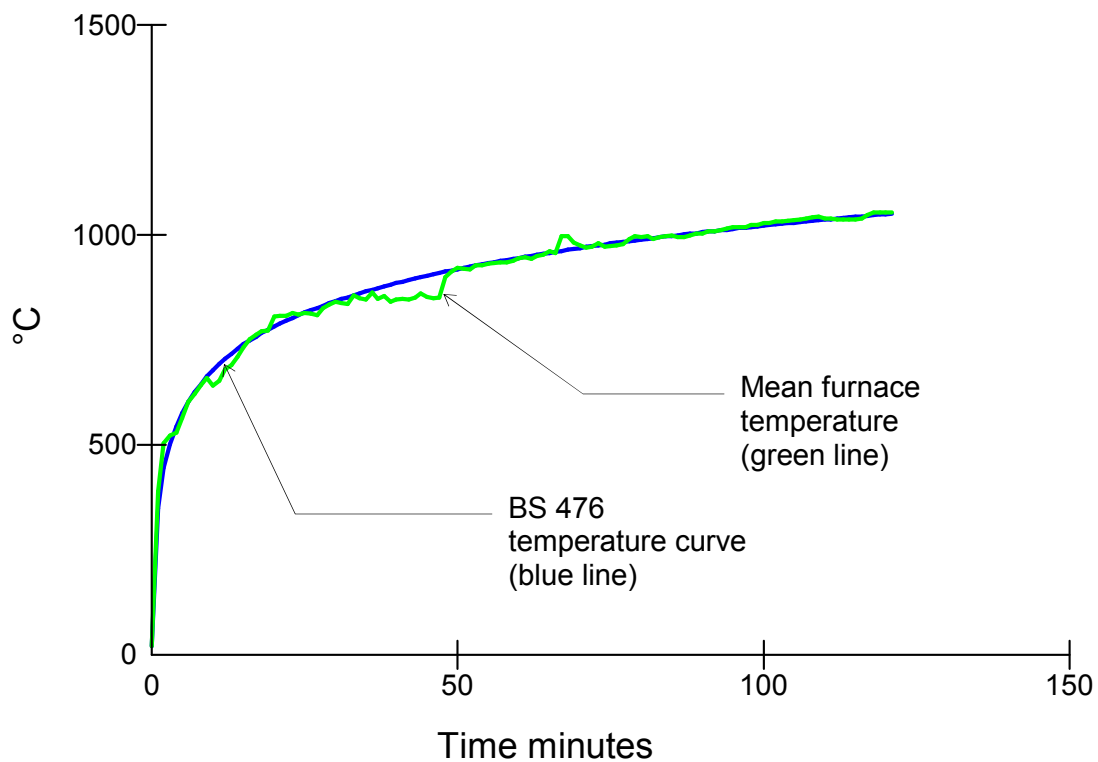
## 5 Test conditions

### 5.1 Ambient temperature

The ambient temperature of the test area at commencement of test was 18°C.

### 5.2 Furnace temperature

The furnace was controlled to follow the temperature/time relationship specified in BS 476: Part 22: 1987, as closely as possible, using the average of four thermocouples suitably distributed within the furnace. The furnace temperatures for the duration of the test are shown graphically below:

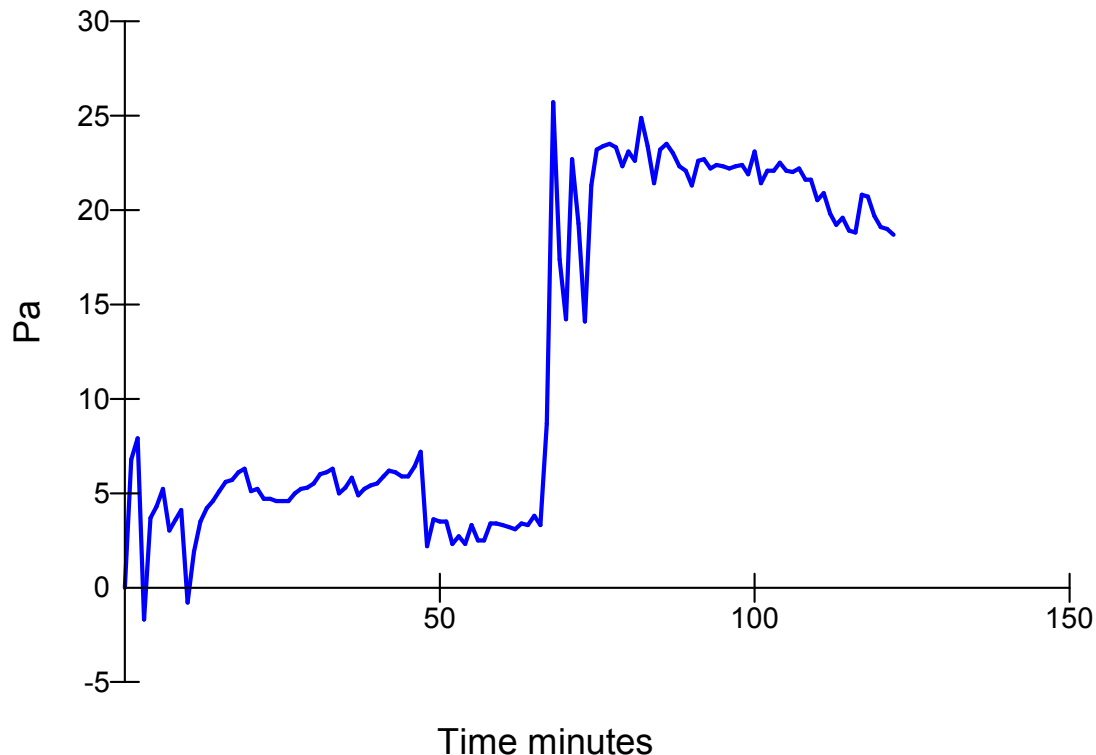


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### 5.3 Pressure readings

After the first 5 minutes of the test, the furnace pressure was maintained at  $5 \pm 5$  Pa and after 10 minutes was maintained at  $5 \pm 3$  Pa with respect to atmosphere 550mm above the top of the top grille vent, equating to 0Pa at the top of the top grille vents for the first 66 minutes. At the request of the sponsor, the pressure was then increased to  $20\text{Pa} \pm 3$  Pa at the top of the top grille vents for the remainder of the test for indication purposes only. The pressure readings are shown graphically below:

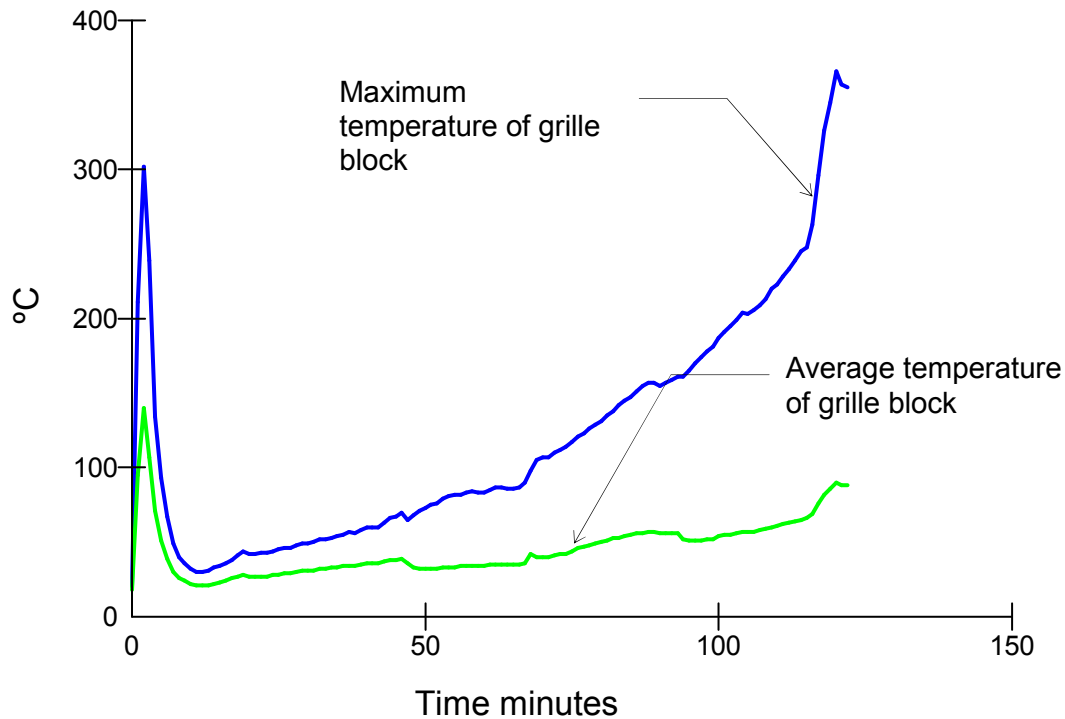


### 5.4 Thermocouple positions

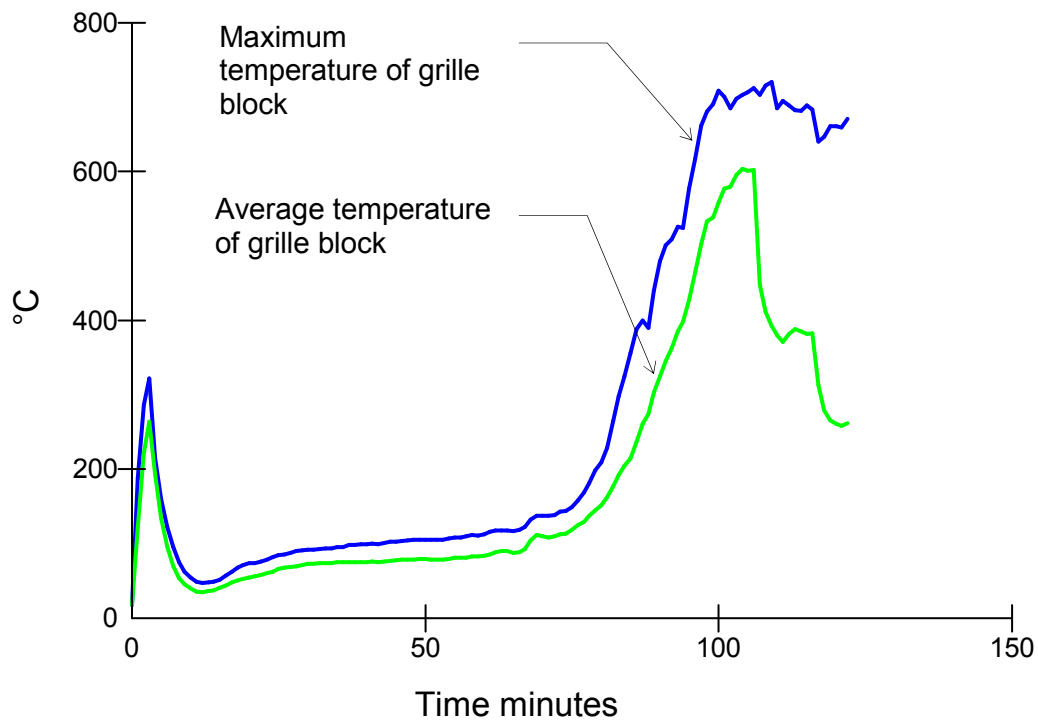
The temperature of the unexposed face was monitored by means of five thermocouples fixed to each steel grille cover: (see Appendix figure 3)

## 5.5 Unexposed face temperatures

### Air transfer grille block A

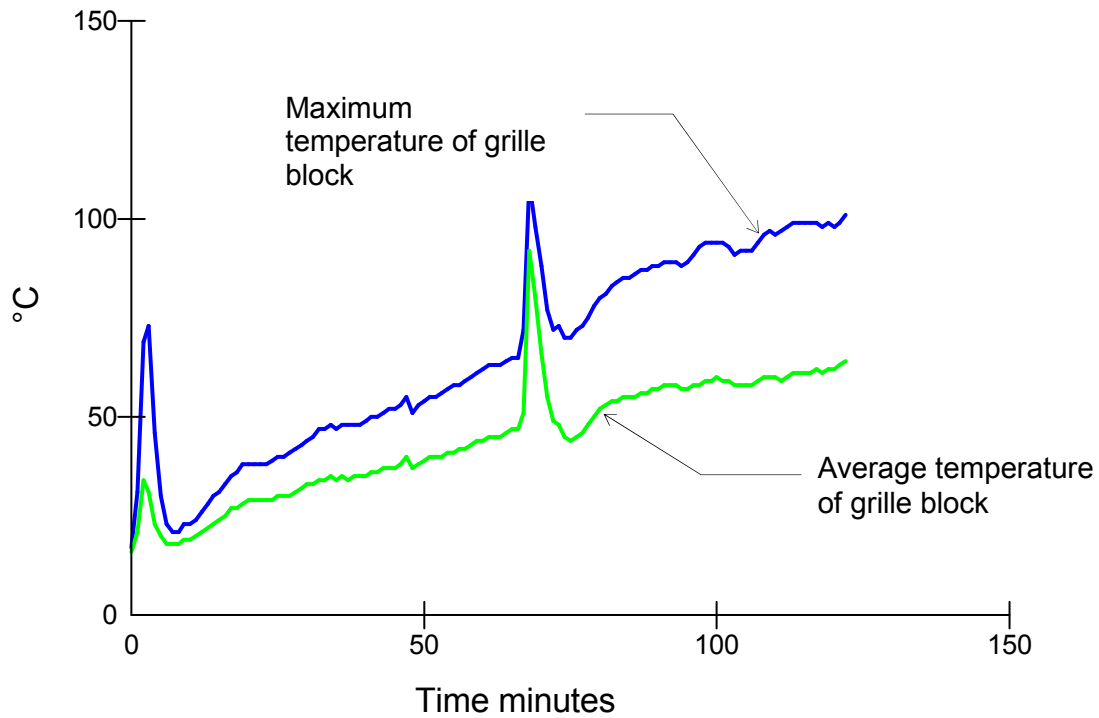


### Air transfer grille block B

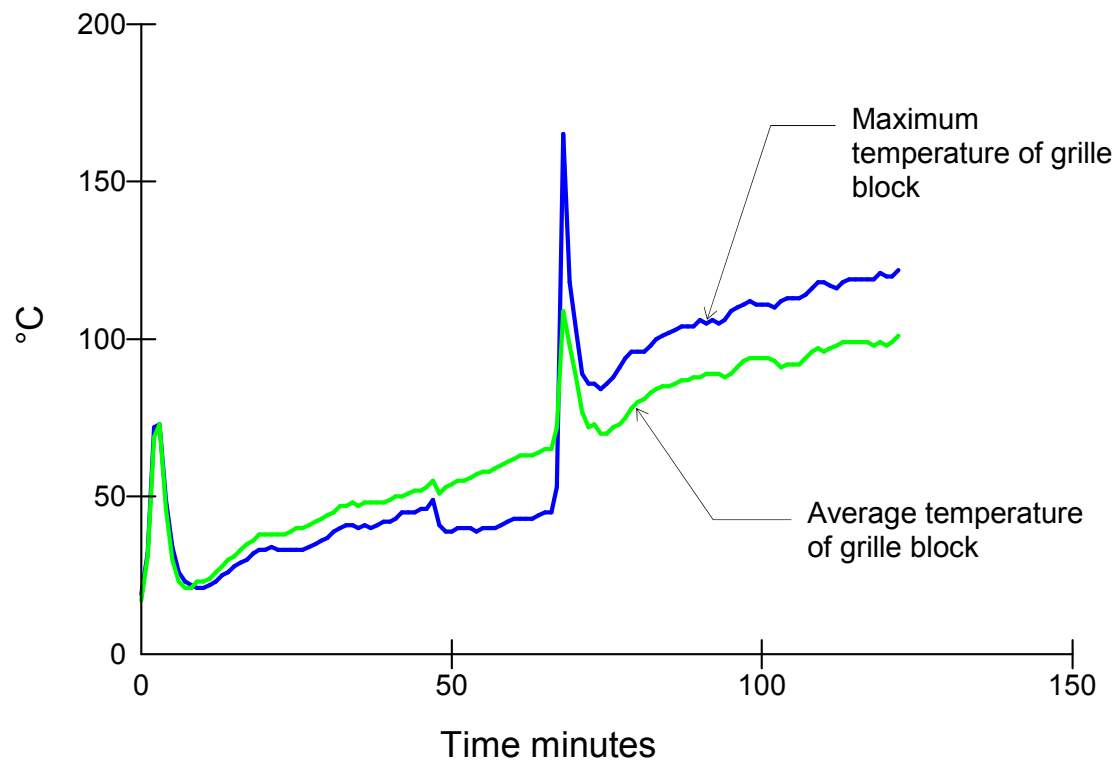


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### Air transfer grille block C



### Air transfer grille block D



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## 6 Observations

All observations relate to the unexposed face unless otherwise stated.

Time (minutes)	Comments
04.00	A and B, the intumescent is starting to react.
20.00	A is full sealed. B, approximately 70% is sealed. C and D, no intumescent reaction.
30.00	No change.
50.00	B has fully sealed. D has started to slowly react.
56.50	A and B, there are multiple glows visible as the intumescent breaks down.
66.00	No failures. Pressure is increased to 20 at the top of the vent for indicative purposes, at the request of the test sponsor.
69.00	C and D have fully sealed.
76.00	A and B, there are multiple glows visible through the grille, intumescent seal area continues to break down.
81.00	A, a cotton pad integrity test was performed at the top of grille, no failure or char to cotton pad.
83.00	A, a roving thermocouple reading was taken at thermocouple position 12 where a temperature of 193°C was recorded.
89.01	A, a roving thermocouple reading was taken at thermocouple position 12 where a temperature of 220°C was recorded.
92.45	B, a cotton pad integrity test was performed in the centre of specimen which resulted in ignition of the cotton pad thereby constituting <b>integrity failure</b> . Thermocouple temperature is over 300°C.
95.00	A, a cotton pad integrity test was performed on the centre of specimen, no failure. A roving thermocouple reading was taken and a temperature of 300+°C was recorded.
98.00	A, a cotton pad integrity test was performed on the centre of specimen, no failure. A roving thermocouple reading was taken and a temperature of 300+°C was recorded.
98.20	B, approximately 50% of the intumescent has eroded away in the centre with a large glow visible on the unexposed grille. A, approximately 25% of the intumescent has eroded away.

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- 105.00 A, a cotton pad integrity test was performed on specimen, no failure. A roving thermocouple reading was taken where a temperature of 300+°C was recorded.
- 110.00 A, a cotton pad integrity test was performed on specimen, no failure. A roving thermocouple reading was taken where a temperature of 300+°C was recorded.
- 114.00 A, a cotton pad integrity test was performed on specimen, no failure. A roving thermocouple reading was taken where a temperature of 300+°C was recorded.
- 117.00 A, a cotton pad integrity test was performed on specimen\*, no failure. a roving thermocouple reading was taken where a temperature of 300+°C was recorded.
- 122.00 Test terminated.

## 7 Expression of results

### Performance up to 66 minutes under negative pressure regime

	Integrity			Insulation
	Cotton pad	Gap gauge	Continuous flaming	
Air transfer grill block A	66* (sixty six) minutes	66* (sixty six) minutes	66* (sixty six) minutes	66* (sixty six) minutes
Air transfer grill block B	66* (sixty six) minutes	66* (sixty six) minutes	66* (sixty six) minutes	66* (sixty six) minutes
Air transfer grill block C	66* (sixty six) minutes	66* (sixty six) minutes	66* (sixty six) minutes	66* (sixty six) minutes
Air transfer grill block D	66* (sixty six) minutes	66* (sixty six) minutes	66* (sixty six) minutes	66* (sixty six) minutes

\* No failure had occurred at 66 minutes

### \* Performance after 66 minutes under a positive pressure regime

\* These results should be used for indication purposes only as the pressure regime was not positive for the full test duration

	Integrity			Insulation
	Cotton pad	Gap gauge	Continuous flaming	
Air transfer grill block A	122* (one hundred and twenty two) minutes	122* (one hundred and twenty two) minutes	122* (one hundred and twenty two) minutes	89# (one hundred and twenty one) minutes – recorded with roving thermocouple
Air transfer grill block B	92 (ninety two) minutes	92** (ninety two) minutes	92** (ninety two) minutes	78# (seventy eight) minutes
Air transfer grill block C	122* (one hundred and twenty two) minutes	122* (one hundred and twenty two) minutes	122* (one hundred and twenty two) minutes	122* (one hundred and twenty two) minutes
Air transfer grill block D	122* (one hundred and twenty two) minutes	122* (one hundred and twenty two) minutes	122* (one hundred and twenty two) minutes	122* (one hundred and twenty two) minutes

\* Failure criteria were not achieved upon termination of the test at 122 (one hundred and twenty two) minutes

\*\* Failure criteria were not achieved prior to initial failure

# Recorded after the grille blocks had fully reacted

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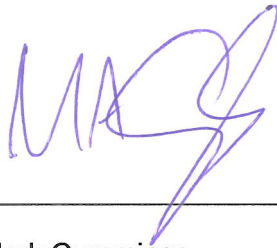
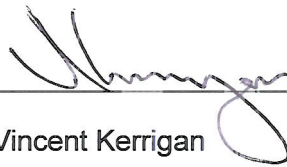
## 8 Limitations

The results only relate to the behaviour of the element of construction under the particular conditions of test; they are not intended to be the sole criteria for assessing the potential fire performance of the element in use nor do they reflect the actual behaviour in fires.

The specification and interpretation of fire test methods are the subject of ongoing development and refinement. Changes in associated legislation may also occur. For these reasons it is recommended that the relevance of test reports over 5 years old should be considered by the user. CIFL will be able to offer, on behalf of the legal owner, a review of the procedures adopted for a particular test to ensure that they are consistent with current practices, and if required may endorse the test report.

The legal validity of this report can only be claimed in reference to the air transfer grille block manufactured or licensed for manufacture by the initial sponsor (details held in confidence on file by Chiltern International Fire Ltd.)

A test certificate has been created in addition to this test report and is referenced "test certificate Chilt/IF10070 AR1 Revision A"

<b>Signature:</b>		
<b>Name:</b>	Mark Cummings	Vincent Kerrigan
<b>Title:</b>	Deputy Technical Manager	Technical Manager
<b>Date of issue:</b>	20/1/12	20-01-2012

Revision A – changes to limitations, page 11.

## 9 Photograph

Unexposed face of air transfer grille blocks at start of test



After 60 minutes



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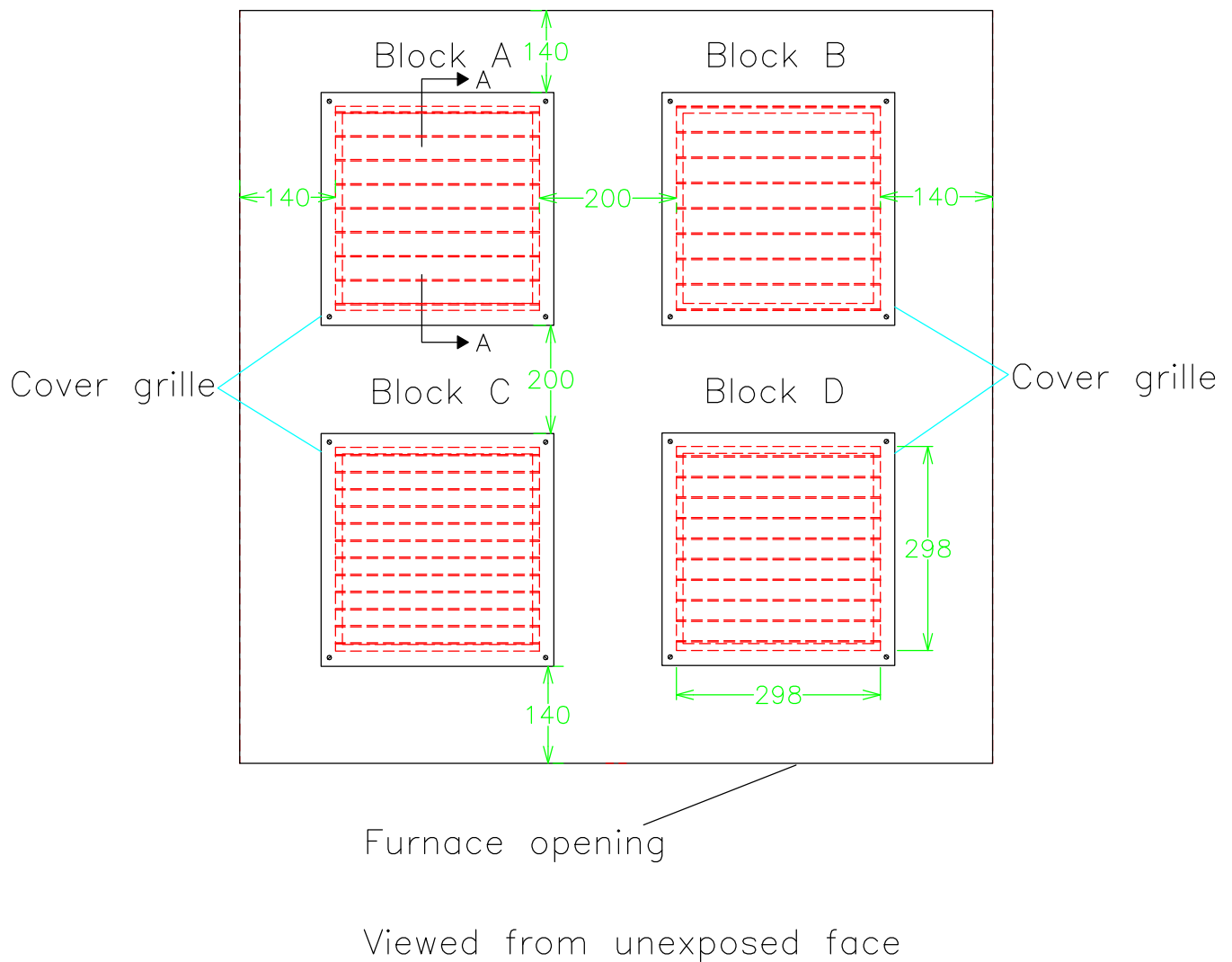
After 120 minutes



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## Appendix – figures 1 - 3





Chiltern House, Stocking Lane, Hughenden Valley  
High Wycombe, Buckinghamshire, HP14 4ND, UK.  
Tel: +44 (0)1494 569800 Fax: +44 (0)1494 564895

Title Unexposed face elevation  
of the wall construction  
(All dimensions in mm)

Date Drawn  
1/11/10

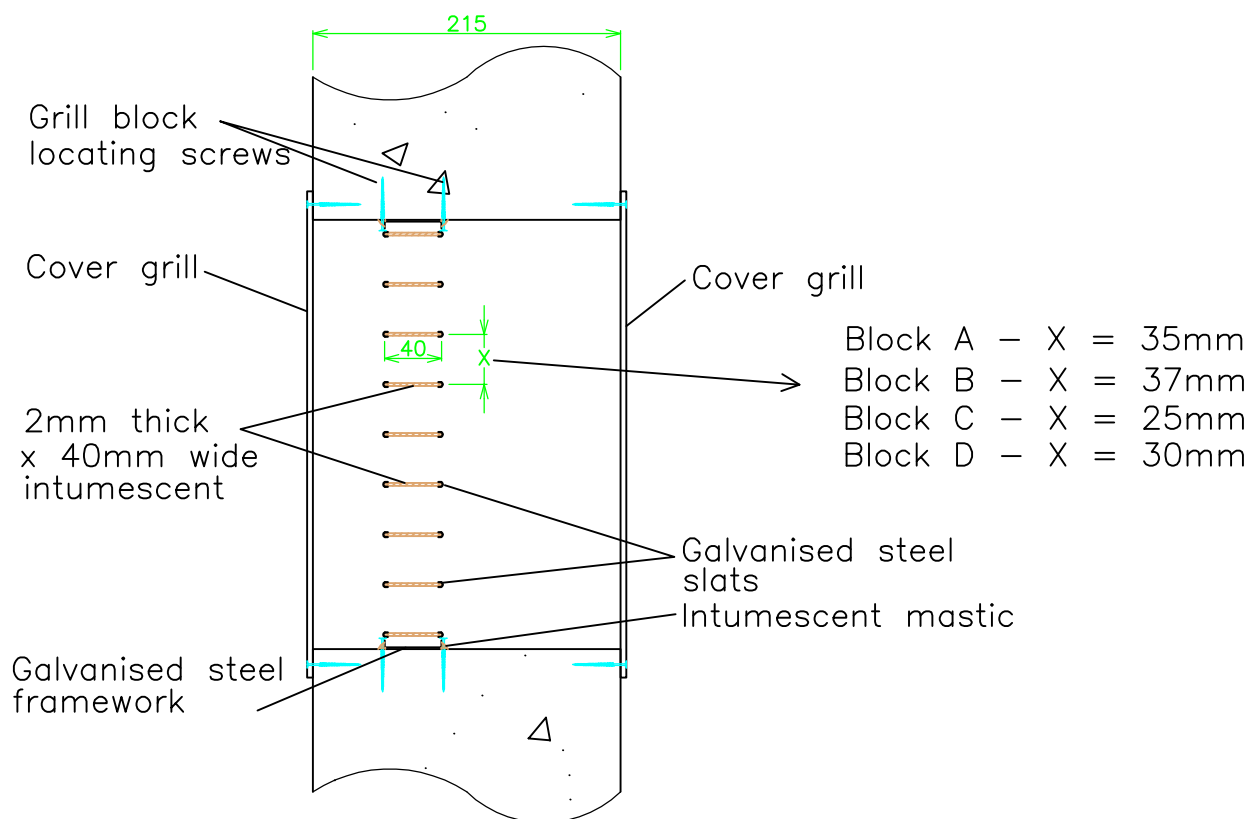
Drawn By  
ARD

Scale  
NTS

Project No.  
Chilt/IF10070 AR1 Rev A

Appendix

## Section A-A



Fire Side



Chiltern House, Stocking Lane, Hughenden Valley  
High Wycombe, Buckinghamshire, HP14 4ND, UK.  
Tel: +44 (0)1494 569800 Fax: +44 (0)1494 564895

Title

Vertical cross section  
(All dimensions in mm)

Date Drawn

1/11/10

Drawn By

ARD

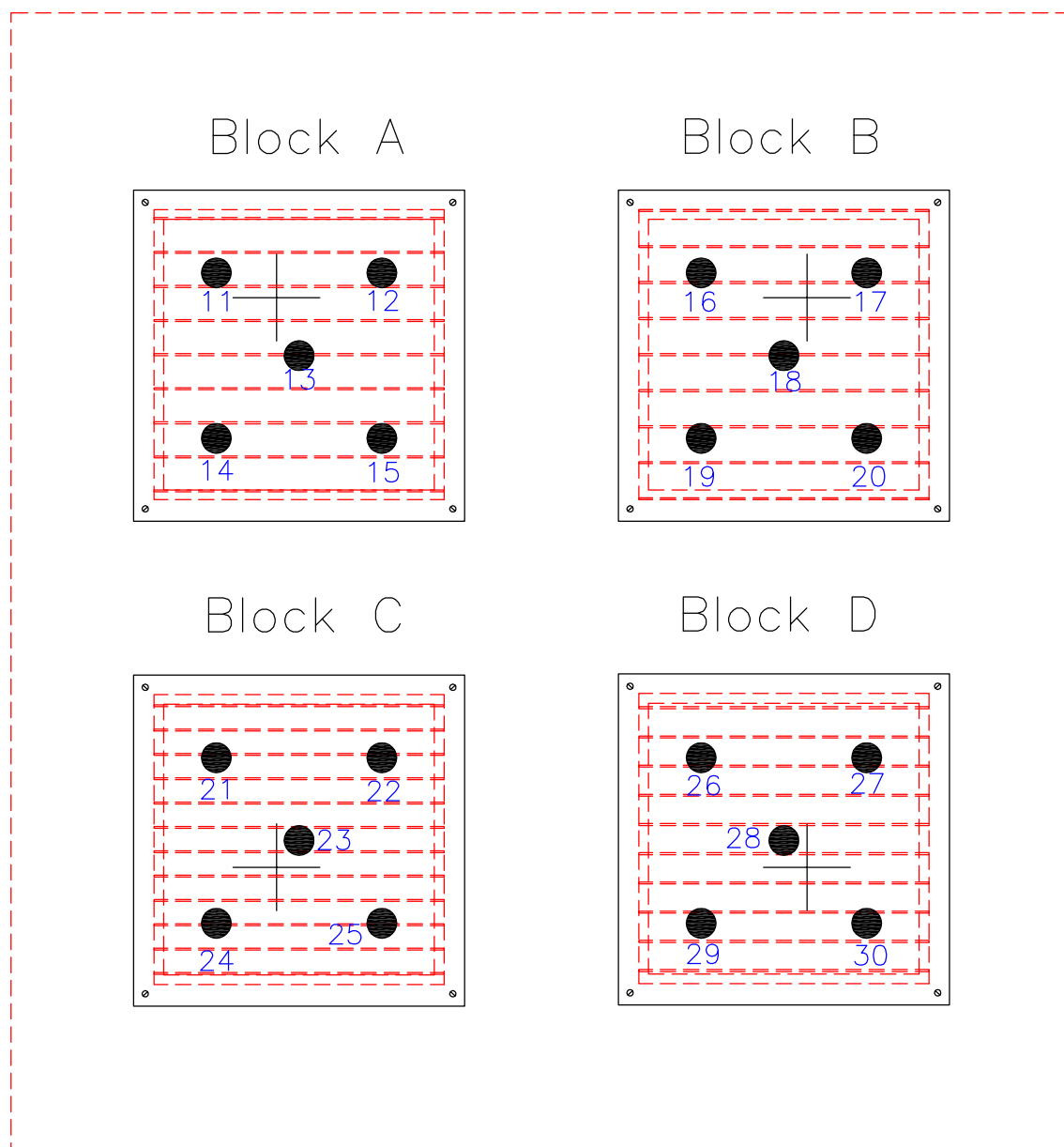
Scale

NTS

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Chilt/IF10070 AR1 Rev A

Appendix



Furnace opening

+: Furnace thermocouples

●: Furnace thermocouples

Viewed from unexposed face



Chiltern House, Stocking Lane, Hughenden Valley  
High Wycombe, Buckinghamshire, HP14 4ND, UK.  
Tel: +44 (0)1494 569800 Fax: +44 (0)1494 564895

Title Unexposed face elevations  
showing thermocouple positions  
(All dimensions in mm)

Date Drawn  
1/11/10

Drawn By  
ARD

Scale  
NTS

Project No.  
Chilt/IF10070 AR1 Rev A

Appendix